

## ATTACHMENT 2

### SUMMARY OF IMPACTS FROM PROPOSED RULE REVISIONS

The Department is proposing to revise its solid waste management rules governing the design and operation of solid waste landfills. The proposed revisions may cause a variety of impacts to the environment, both positive and negative. This summary lists the most significant potential impacts of the proposed rule revisions, to the extent they can be foreseen.\*

*Overview of the Proposed Rule Revisions:* The revised rules would:

- allow municipal solid waste landfill operators to propose landfills with longer leachate collection lines than are allowed by current rules;
- require upgraded design, construction and operation standards for solid waste landfills;
- require improvements in construction quality assurance and documentation for collection pipe and composite liners;
- foster the addition of leachate and, potentially, other liquids and sludges to landfilled waste in order to encourage quicker degradation of the waste; and
- require municipal solid waste landfill operators to plan and implement strategies to reduce the impact of undegraded organic materials in landfills by diverting or more quickly degrading these materials.

*Direct Effects of the Proposed Rule Revisions:*

- (1) **Landfill Size:** An increase in the allowable length of leachate collection lines from 1200 feet to 2000 feet would result in larger municipal solid waste landfill footprints and an increase in maximum allowable waste heights from approximately 150 to 250 feet above ground surface. Deeper landfills allow more waste to be placed above a given area of landfill liner. This fact, in addition to other economies of scale such as improved infrastructure utilization, would be expected to reduce costs for landfill owners.

Increasing the maximum leachate line length would allow for more efficient utilization of landfill properties and could make it easier to avoid or delay impacts to sensitive areas such as wetlands.

Longer allowable leachate collection lines might also result in siting proposals requesting significantly greater disposal volume. Note that some uncertainty exists regarding the extent to which extending the maximum leachate line length would lead to larger siting proposals. Other factors involved are: the statutory 15-year limit on landfill design

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\* The Department considered issues associated with longer leachate lines early in the rule development process. The Technical Advisory Committee formed a workgroup, the “Impacts of Larger Landfills” workgroup, to define potential primary and secondary impacts arising from approval of longer lines in Wisconsin. The workgroup’s conclusions were among the considerations the Department took into account in its decision to proceed with rule development.

capacity; the statutory requirement to document the need for a new landfill or expansion of an existing landfill; the required setbacks from streams, lakes, highways, and other physical features; local negotiated agreements and local regulations limiting the sources of waste to landfills; and economic and market forces which influence the amount of waste available for landfilling. Still, there are strong motivations for landfill operators to maximize the size of their siting proposals, and the Department believes it is likely that the proposed code change would lead to significantly larger siting proposals, particularly from private companies.

Larger landfill footprints and siting proposals would represent an extension of a two-decade trend in Wisconsin from smaller local landfills to larger regional landfills. This trend toward fewer landfill locations would likely continue (perhaps at a slower pace) without a change in the 1200-foot limit on leachate line length.

- (2) **Increased Moisture Content in Landfilled Waste:** The proposed rules would likely lead to increased moisture contents in landfilled waste by codifying standards and practices for leachate recirculation, and by establishing (subject to U.S. EPA authorization) a system of Research, Development and Demonstration (RD&D) projects that could include approval to dispose of nonhazardous liquid wastes (other than leachate) and sludges in municipal solid waste landfills.
- (3) **More Rigorous Design, Construction and Operation Standards for Landfills:** The proposed rule includes a number of provisions that would upgrade minimum specifications for solid waste landfills. Many of these would apply to all landfills regardless of whether their leachate collection lines would exceed 1200 feet in length, including:
  - additional requirements for the design of leachate collection pipe trenches and sumps;
  - an increased hydraulic conductivity requirement for leachate collection layers at the bottom of landfills;
  - formal analysis of head and stability of the drainage layer of the landfill cap;
  - more rigorous requirements for cleaning and inspecting leachate collection pipes;
  - consistent requirements for operation, monitoring, and reporting of leachate recirculation operations;
  - use of leak location testing to ensure the quality of installed liners; and
  - a requirement that landfills incorporate plans for reducing the amount of degradable organic material remaining after site closure.

Additional requirements would be imposed upon landfills with collection lines longer than 1200 feet, to maintain landfill environmental performance relative to current standards in light of the potential for larger, higher landfills. These requirements include:

- more robust materials requirements and design features for leachate collection systems;
- higher base slopes to encourage leachate flow to the collection system;

- increased standards for geologic and slope stability investigations; and
- an increased level of engineering analysis of a variety of landfill design features such as hydraulic capacity and pipe strength.

*Indirect Effects of the Proposed Rule Revisions:* The key indirect effects of the proposed rule changes arise from the potential for larger municipal solid waste landfills and the degree to which this might translate into higher waste disposal rates instead of more efficient management of wastes.

- (1) **Recycling and Waste Reduction:** If larger landfill siting proposals lead to increased aggregate capacity for land disposal in Wisconsin, tipping fees could be driven down in response to increased competition for waste and lower costs incurred by landfill owners. All other factors being equal, this would represent a relative increase in the cost of other options in the waste management hierarchy, such as recycling, reuse, energy recovery, and waste reduction, compared to land disposal, and consequently harm the competitive position of alternatives to landfilling. In the extreme, an increased price differential (as might happen during a cyclical downturn in commodity prices for recycled materials) could provide pressure to reduce or eliminate mandatory recycling.

In addition to the economic factors, approving higher-capacity sites could diminish pressure to pursue technological advances that might lead to more sustainable landfills and waste management practices. In part, the proposed code provision requiring landfill operators to submit organic stability plans responds to this potential effect.

- (2) **Waste Imports to Wisconsin:** To the extent that larger landfills in Wisconsin led to a reduction in landfilling costs and/or tipping fees, interstate waste shipments to Wisconsin could increase. Increasing the allowable design capacity of municipal solid waste landfills would support the trend for commercial operators to extend their service areas over larger areas. Other driving factors for waste imports include the relative ease of siting new or expanded facilities in Wisconsin, the relative taxes and surcharges imposed on waste tipping in Wisconsin, and the economics of waste transportation. The potential to site larger landfills would make Wisconsin a more attractive place to build a new landfill or expand an existing one.
- (3) **Number and Ownership of Landfills in Wisconsin:** Larger landfills could decrease the number of landfills needed to satisfy the demand for waste disposal (neglecting the increased demand that might result from lower prices). Unless additional waste were generated from Wisconsin or imported from other states, Wisconsin might ultimately be home to fewer, larger landfills. Ownership patterns might change, too: it is likely that larger regional landfills owned by large private companies would be better able to take advantage of the economies of scale offered by the increase in allowable landfill size than the county-owned landfills. Over time, this might place the county landfills at a competitive disadvantage and result in discontinued operations by some county landfills. The trend toward larger, privately owned landfills has been at work in Wisconsin for at least the last two to three decades.

- (4) More Transfer Stations: Siting of larger landfills could lead to an increase reliance on transfer stations to consolidate waste for longer hauls.
- (5) Concentration of Impacts: Siting of larger landfills would tend to concentrate local impacts such as traffic (for construction and for delivery of waste), noise, odors and litter, with consequent impacts to the quality of life for local residents.

Other indirect effects that can be anticipated include:

- (6) Increased Competition for Liquid Wastes: Landfills are likely to compete with existing outlets such as wastewater treatment plants for nonhazardous liquid waste streams. While these wastes streams are a source of revenue for municipal treatment plants and in some cases needed for the biological treatment process, the wastewater treatment plant's receiving water body (surface or ground water) would see a reduced load as a result of the nonhazardous waste stream being diverted to a landfill.
- (7) Increased Onsite Use of Landfill Leachate: The RD&D provisions of the proposed rule, where implemented, would likely result in the use of landfill leachate from closed units for recirculation in neighboring active units. This would reduce the amount of leachate transported to wastewater treatment facilities.
- (8) Increased Diversion of Organic Wastes: The stability plan requirement of the proposed rule could lead to increased efforts to divert organic materials such as food waste and compostable paper away from landfill disposal. To the extent this occurred, it would reduce the total volume of materials destined for landfill disposal, and increase the volume managed in other ways such as composting or anaerobic digestion.
- (9) Greater Creativity in Waste Management: The stability plan requirement might also provide an impetus for more creative alternatives to be proposed, such as pilot projects for organic waste separation.
- (10) Changes in Relations with Host Communities: Increasing the allowable footprint size and capacity of landfills may lead to active landfill lives longer than what is anticipated by local residents, increasing the perceived stress on these residents. This may also result in an extended time period over which local municipalities benefit from services and payments specified in local negotiated agreements with the landfill operators.

*Benefits Associated with the Proposed Rule Revisions:*

- (1) Fewer Landfills: If the average size of contiguous landfill footprints in Wisconsin increases, fewer total acres might be needed for waste disposal, which might translate into few locations where landfilling would occur. This assumes that waste generation rates would not increase significantly as a result of the greater availability of disposal space, and that waste imports to Wisconsin would not consume the additional capacity provided by the larger landfill footprints.

To the extent that these assumptions are true, there would be a decrease in the number of host communities that would have to undergo the siting process, the number of greenfield sites given over to landfilling, the number of individuals that would have landfills as neighbors, and the number of landfills posing short-term and long-term environmental risks. This would result in a lower loss of wildlife habitat and farmland resources.

- (2) **Greater Efficiency:** Increasing the average capacity per landfill site would represent more efficient use of landfill infrastructure such as offices, scales, roads, leachate and gas controls, and monitoring systems, as well as material resources such as clay, stone, and geosynthetics. Administering and reviewing fewer siting episodes would also be more efficient for government at the state and local level, although siting issues may be more complex at each site.
- (3) **Safer Landfills:** Many of the proposed rule revisions upgrade landfill standards for all landfills regardless of size. Some of the proposed improvements are already in use at existing landfills. For other landfills, these upgraded standards would lead to improved operations and reduced risk of systems failures.
- (4) **Reduced Long-Term Care Burden:** The proposed rules include a provision requiring landfill operators to submit a plan for significantly reducing the amount of degradable organic waste remaining at landfill closure. If successful, this provision could, over time, increase landfill physical stability, reduce leachate and gas production, and reduce the amount of long-term maintenance needed at closed landfills. Rule provisions allowing additions of liquids and sludges could also promote more rapid waste degradation.
- (5) **Lower Emissions and Higher Materials Recovery:** If the stability plan requirement leads to increased diversion of organic materials over the long term, methane emissions from anaerobic degradation in landfills would decrease and more organic materials would be returned to beneficial uses such as compost for soil stabilization or enhancement.
- (6) **More Landfill Gas Utilization:** While many landfill gas-to-energy applications are currently in operation in Wisconsin, larger landfills, deeper waste thicknesses and increased disposal of liquid wastes would promote higher and faster gas production and increased utilization of landfill gas for production of electricity. Landfill gas-to-energy projects are generally considered to be more economically viable at larger scales.

#### *Costs and Risks Associated with the Proposed Rule Revisions:*

- (1) **Risk of Failure:** Higher, deeper landfills – common in other parts of the United States – exert greater forces on engineered components including leachate and gas collection systems, liners, and sideslopes. Adding liquids to the waste mass will increase these forces and, to some extent, reduce the physical stability of the waste mass. Longer leachate collection lines are also more difficult to clean. The proposed rules include

provisions intended to compensate for the increased potential for problems by increasing the engineering standards of landfills in general and larger landfills in particular.

An additional potential risk attributable to the increased size of landfills is the greater difficulty of remediating problems that occur. Because many of the potential problems involve deeply buried engineered features such as leachate collection lines and sumps, a failure of these features could be extremely difficult or, possibly, impractical to remedy. These risks can be ameliorated in a limited way through more robust or redundant designs to increase the likelihood that failure of an engineered system does not mean failure of a site.

Larger landfills with additional features such as leachate recirculation and use of additional liquids may increase the need for staff at landfills. This would run counter to the current trend for very lean staffing levels at landfills for both operational and technical personnel. The potential increase in complexity and risk associated with larger landfills will also increase the need for Department oversight of landfill construction and operation. Increased gas and odor emissions at larger landfills may be harder to correct and will increase pressure to inspect and investigate problems and corrective actions.

- (2) **Potential for Increased Emissions of Environmental Pollutants:** Greater waste depths create larger forces on buried components of the landfill such as leachate collection lines, with more potential for failure. Larger landfills also generally have more complex gas collection systems, longer slopes to generate runoff and sediment, and more stormwater runoff to manage through drainage structures.

Larger landfills also increase the potential for air quality impacts. With larger phases and open areas, and potentially longer intervals before phase closure, there is a likelihood for more fugitive emissions of air pollutants and greenhouse gases. These emissions might be increased further by liquids addition, which hastens the breakdown of the waste before gas capture systems and final cover can be installed.

In addition to emissions of pollutants, larger and higher landfills have greater potential to cause more aesthetic problems including visual, odor and litter problems. Higher landfills would be more difficult to screen visually.

One way the Department has managed the risks posed by landfills to environmental and public assets is through its locational standards. These standards establish minimum setbacks for landfills from streams, lakes, highways, parks, water supply wells and airports. Property line setbacks are also set forth in state solid waste codes. At this time, the Department has not proposed changing its locational standards for landfills to account for potentially larger, higher landfills.

Longer waste hauling distances would increase fossil fuel usage and diesel emissions.

- (3) **Financial Risks to the State:** Landfills of any size pose a long-term risk to the State because, although owners are responsible in perpetuity for their maintenance and care,

they are only required to demonstrate financial resources for these routine maintenance for a period of 40 years after closure. Financial responsibility for remediation of unexpected problems is required as well, but only after a problem has been discovered. There is no guarantee that owners—often private companies—will remain viable for the same period of time that their landfills will require routine maintenance or remediation. If the private resources are not available to maintain facilities or correct problems, the State would have to step in to protect public health and the environment. The potential cost of maintenance is proportional with the size of the facility. Remedial costs rise more quickly as landfill size increases. Larger landfills would therefore increase the long-term financial risk to the State.